Generative AI with AWS: Project Documentation Report

1. Project Overview

- **Project Title**: Generative AI with AWS
- **Project Goal**: This project demonstrates the application of generative AI using AWS services, including dataset preparation, model fine-tuning, and evaluation. The goal is to build a lightweight generative AI model optimized for specific tasks using AWS services for scalability and deployment.

2. Features

- Model fine-tuning with custom datasets.
- Evaluation metrics for generative models.
- Scalability and deployment using AWS services.

3. Prerequisites

- **Software Requirements**:
  - Python 3.8+
  - Jupyter Notebook
- **Libraries**: TensorFlow, PyTorch, or other relevant ML frameworks.
- **AWS**: AWS account with configured CLI for deployment.

4. Installation Instructions

- Clone the repository:

```
bash
Copy code
git clone https://github.com/yourusername/GenerativeAI_AWS_Project.git
cd GenerativeAI_AWS_Project
```

- Install dependencies:

```
bash
Copy code
pip install -r requirements.txt
```

- Configure AWS CLI:

```
bash
Copy code
aws configure
```

5. Usage

- **Model Fine-Tuning**:
  1. Open `Model_FineTuning.ipynb` in Jupyter Notebook.
  2. Follow the steps for dataset preparation and model training.
  3. Save the fine-tuned model for evaluation.
- **Model Evaluation**:
  1. Open `Model_Evaluation_UdacityGenAIAWS.ipynb` in Jupyter Notebook.
  2. Load the fine-tuned model and evaluate its performance.

6. Dataset

- The dataset used for this project is provided as `ITDataset.txt`. Please ensure you comply with any licensing requirements for its use.

7. AWS Integration

- This project leverages AWS services for scalability, deployment, and model optimization. Key AWS services used include:
  - **Amazon SageMaker**: For model training and deployment.
  - **AWS Lambda**: For serverless execution of inference tasks.
  - **AWS S3**: For storing dataset and model checkpoints.

8. Evaluation Metrics

- The evaluation of the model includes metrics like accuracy, precision, recall, and F1-score based on the specific generative task.

9. Project Structure

- **`Model_FineTuning.ipynb`**: Jupyter notebook for training the model.
- **`Model_Evaluation_UdacityGenAIAWS.ipynb`**: Jupyter notebook for evaluating the fine-tuned model.
- **`ITDataset.txt`**: The dataset used for training the model.
- **`docs/` folder**:
  - `Project Documentation Report.pdf`
  - `Screenshots.pdf`
- **`requirements.txt`**: Python dependencies for the project.

10. License

- This project is licensed under the MIT License. See the LICENSE.txt file for details.

11. Acknowledgments

- This project is based on the Udacity "Introduction to Generative AI with AWS" course. Special thanks to the course instructors and contributors for their invaluable guidance.

12. Contributing

- Contributions are welcome! Feel free to open an issue or submit a pull request.